

7.

7.1 a) standard:  $\text{index} = X_2 * L_1 + X_1$

Inverse :  $X_2 = \text{index} / L_1$   
 $X_1 = \text{index} \% L_1$

7.2 a) standard : suppose  $a$  the dimension of the matrix is  $N$   
 we got a series (size =  $N$ )  $a_n = \begin{cases} a_n = 1 & n=1 \\ a_n = \prod_{i=1}^{n-1} L_i & n>1 \end{cases}$

$$\therefore \text{index} = \sum_{i=1}^N a_i * X_i$$

Inverse : Based on the results of 'standard'

It is clear that

let  $i = \{N, N-1, \dots, 1\}$   $X_i = I_{i+1} / a_i$   
 $I_{i-1} = I_i \% a_i$  from the reverse sort